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Yoshiaki Arata

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SNELL & WILMER L.L.P. (Main)
400 EAST VAN BUREN
ONE ARIZONA CENTER
PHOENIX, AZ 85004-2202

EXAMINER

DUDNIKOV, VADIM

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/530,982	Applicant(s) ARATA, YOSHIKI	
	Examiner VADIM DUDNIKOV	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) 3-5,8 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,6 and 9-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 July 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/3/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the response filing at 06/03/2008.

Election/Restrictions

1. Applicant's election without traverse in reply filed 6/3/08 of Group I, claims 1, 6, 9, 10 and 11 species and sub-species A (ultrasonic waves) for method of activation is acknowledged.

Claims 1, 6 and 9-11 are accepted for consideration. Claims 3, 4, 5 and 12 are withdrawn from consideration as non-elected. Claims 2 and 7 have been canceled.

The Restriction and Election-of-Species Requirement is herewith made FINAL.

Information Disclosure Statement

2. The information disclosure statements filed 04/03/2008 and all other information or that portion which caused it to be listed has been placed in the application file. The information has been considered. A signed copy of Form 1449 has been enclosed. Said information is insufficient for overcoming the Specification Objection and claim rejection under 35 U.S.C. §101 and §112 in the previous Office Action..

Response to Amendment

3. Applicant's Amendment filed 02/04/08 and 06/03/08, which amended claims 1, 3, 6 and 8, canceled claims 2 and 7, add new claims 11-12, withdrawn claims 3, 4, 5 and 12 as non-elected and traversed the rejection of the claims in the 10/03/08 Office action are acknowledged. Applicant's Amendment filed 02/04/08 and 06/03/08 are insufficient for overcoming the Specification Objection and claim rejection under 35 U.S.C. §101 and §112 in the previous Office Action.

Response to Arguments

4. Applicant's arguments on pages 6-10 filed 02/04/2004, with respect to of said previous Office have been fully considered but they are not in every respect persuasive. Claims 1, 3-6 and 8-12 are pending. Claims 1, 6 and 9-11 are examined. Rejections of claims are established in light of further consideration of disclosure, further consideration and search of the prior Art. See rejections underneath. Applicant's traverse of Specification objection and claims rejection under 35 U.S.C. §101 and §112 are not persuasive because applicant's conclusion in asserts (h) on page 8: "The ultrasonic wave transfer medium was also vaporized in the process. The analysis of the gases produced (see Figure 6 and supporting descriptions) show the **generation of helium by a large magnitude** of an order or more, which is a byproduct

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of deuterium atom-deuterium atom fusion" interpreted as a fusion of two deuterium nucleon into ^4He nucleus in a solid volume at low temperature and without high energy radiation emission **contradicts** to modern nuclear physics and solid state physics.

There are **no independent** conformation, no credible support or credible theoretical explanation of a large rate fusion of deuteron to ^4He in solid at low temperature and without high energy radiation emission as disclosed in Application disclosure.

The fusion of two deuterium nucleon into ^4He nucleus in a solid at low temperature with ultrasound material activation and without high energy radiation emission was claimed before by Hagelstein (US 2007/0286324 A1: "A method and apparatus employ stimulating a material to cause reactions in the material, wherein the material comprises deuterium, and wherein the reactions generate vibrational motion of the material, coupling the vibrational motion to a transducer that generates energy from the vibrational motion of the material, and directing the energy to an electrical device" (Abstract), and in WO 90/13129) but a possibility of existence of said process was not confirmed. A negative results of said process detection was reported by Dignan et al. ("A search for Neutrons from Fusion in a Highly Deuterated Cooled Palladium Thin Film", Journal of Fusion Energy, V. 9, No. 4, 469, 1990).

Applicant's conclusion in asserts on page 8: "Accordingly, contrary to the Examiner's assertion, Applicants assert that this is significant evidence of the fusion of deuterium atoms to produce energy and helium. The evidence clearly points to the conclusion of a fusion reaction. Even if this fusion reaction does not take place in classical and accepted theoretical models, it cannot be denied that a deuterium- deuterium fusion

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reaction has occurred with some release of energy” and in following asserts

contradicts well established facts and laws of modern nuclear physics and solid state physics. Presented experimental results can have different interpretation which not connected with said cold fusion of deuterons into ^4He nucleons.

For example mass 4 in a mass spectrum in Fig. 6 should be related to D_2 ions, not to ^4He ions. It is difficult to separate D_2 ion from ^4He ion in a simple small mass spectrometer used in said experiments.

Applicant's Arguments filed 02/04/08 is insufficient for overcoming the Specification Objection and claim rejection under 35 U.S.C. §101 and §112 in the previous Office Action.

Claim rejection under 35 U.S.C. §103 is withdrawn.

The Specification Objection and claim rejection under 35 U.S.C. §101 and §112 in the previous Office Action is proper and still valid.

Rejections of claims are established in light of further consideration of disclosure and consideration and search of the prior Art. See rejections underneath.

Specification

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art

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to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. The specification is objected to under 35 U.S.C. 112, first paragraph as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or used the invention, i.e. failing to provide an enabling disclosure. There are many factors recognized by the MPEP that are to be considered when determining whether there is insufficient evidence to support a determination that a disclosure satisfies the enablement requirement, including the nature of the invention, the level of predictability in the art and the existence of working examples. See MPEP 2164.01 (a). The examiner has the initial burden of challenging an asserted utility. Once the examiner has provided evidence showing that one of ordinary skill in the art would reasonably doubt the asserted utility of the invention, the burden shifts to the applicant to provide rebuttal evidence. See MPEP 2164.07(B).

It is considered by the examiner that the invention of the present application is lacking in utility because disclosed in [0001] “**methods of generating heat using the hydrogen condensate**” (i. e. with release of the net nuclear fusion energy above a spend one for activation) that are not proven and are contradicted to a **modern nuclear physics and solid state physics**, to the current understanding of physics and because, even if it were possible to practice the invention, the applicant has not described the method used to implement it in sufficient detail to enable a skilled artisan to make and use it without undue experimentation.

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It is possible to generate the net fusion energy, by metal hydride (deuteride) **activation with a very high power** density, such as thermal, electromagnetic, or the kinetic energy of particles. Also it is possible to activate the fusion by exposing such matter to the energetic particles produced according to the disclosed method, but energy, necessary for activation of hydrogen isotopes fusion is much higher than released from said nuclear fusion. Hydrogen isotope localization by metal lattice (and electron shielding) is close to hydrogen isotopes localization in other molecules and cannot increase probability of nuclear fusion significantly as demonstrated in recent experiments (F. Raiola et al, "Electron shielding in d(d,p)t for deuterided metals and the periodic table", Physics Letters B, V. 547 (3-4), pp.193-199, 2002). Parameters of said "activation" are disclosed in many books related to nuclear Fusion for example in Knief, Nuclear engineering", Hemisphere Publishing Corporation, 1992, pp. 636,642. For net energy production in D-T reaction it is need to heat D-T compound up to 10 keV equal to hundred million degree Celsius and product of density to confinement time should be larger than Lawson criterion (page 641, lines 11+). The electron shielding decreases a threshold energy for dd fusion very little and does not permit net energy production with a low activation energy as necessary for enablement of disclosed invention.

Until now net energy production from solid hydrides were activated only by a nuclear explosion in a "hydrogen" fusion explosion.

Applicant's statement of asserted utility that "The present invention is provided to solve the above-described problems. An object of the present invention is to provide: (1) a hydrogen condensate in which a larger quantity of hydrogen isotope atoms are solid-

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dissolved among metal atoms than in conventional techniques; and (2) a method of generating heat using the hydrogen condensate”.

The “Hydrogen condensate”, disclosed in application cannot enhance an energy efficiency of nuclear fusion with low energy activation significantly up to possibility release of net nuclear energy (as discussed above) with a high rate of ^4He nucleons production without high energy radiation.

The nature of the invention rests on certain basic concepts, including the following:

[0013] “ Another method of the present invention is a method of generating heat using a hydrogen condensate. The hydrogen condensate comprises a metal alloy composite containing a plurality of metal atoms and a plurality of hydrogen isotope atoms solid-dissolved among the plurality of metal, atoms, and at least two of the plurality of hydrogen isotope atoms are condensed so that an inter-atomic nuclear distance between the two hydrogen isotope atoms is smaller than or equal to an internuclear spacing of a molecule consisting of the two hydrogen isotope atoms. The heat generation method comprises applying energy to the hydrogen condensate, and generating heat by causing the at least two hydrogen isotope atoms to react with each other due to the energy. Thereby, the above-described object is achieved.

[0014] The energy may be generated based on at least one of ultrasonic wave, strong magnetic field, high pressure, laser, laser explosive flux-compression, high- density electron beam, high-dense/current, discharge, and chemical reaction.

[0015] In the step of generating heat, the at least two hydrogen isotope atoms are reacted with each other to generate a helium molecule in addition to the heat”.

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1). Accordingly, there is disclosed a method of generating net heat, which comprises contacting metal nanostructures with hydrogen isotopes and applying activation energy to the nanoparticles. In one embodiment, the hydrogen isotopes comprises hydrogen, deuterium, tritium, and combinations thereof .

[0058] The space or room which is retained on a surface layer or in the inside of the host as the capsule is preferably of the nanometer order (e.g., the average diameter of the space regarded as the sphere is preferably about **0.002** to about 200 nm, or preferably about 0.005 to about 50 nm). The number of captured hydrogen isotopes/hydrogen condensate needs to be at least two.

[0089] By applying energy to the ultrahigh-density deuterated nanoparticle, a plurality of deuterium atoms react with one another to generate heat and helium molecules.

The reaction is represented by:

[0090] $2D + 2D = {}^4\text{He} + \text{lattice energy (23.8 MeV)}$.

[0091] The reaction does not generate a neutron and is a mild nuclear fusion reaction, and therefore, is desirably better than a DD nuclear fusion reaction described below.

Therefore, the ultrahigh-density deuterated nanoparticle of the present invention is recommended to be used for a nuclear fusion reaction in terms of the conservation of the environment. The well-known DD nuclear fusion reaction which causes a radical impact of deuterium atoms to generate T and neutrons is extremely dangerous, and therefore, is not desirable in terms of industrial applicability and conservation of the environment.

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[0092] The reaction of deuterium generates high-temperature and high-pressure gas and helium gas in the reaction furnace 201. The high-temperature and high- pressure gas and the helium gas are removed via the gas outlet 205.

The applicant claims that the heat generation and increased concentration of helium 4 was detected after hydride activation by ultrasound waves (Fig. 4, and [0095]-[0098].

There is no credible record to indicate that the “The inside of the reaction furnace 201 is considered to have high temperature and high pressure, indicating a **tremendous nuclear fusion reaction**”.

It is possible to hope that discloses embodiments are based on either rigorous, credible experimental evidence of heat generation. But there are no evidences of activation of fusion reaction, directly contradicts accepted science. In such types of experiments, involving high reactive hydrides with a non equilibrium lattice and hydrogen release it is possible to have different chemical reactions and lattices relaxation with heat generation. There are no credible information related to realization of “the above-described finding, we determined that the resultant nuclear fusion reaction is $^2\text{D} + ^2\text{D} = ^4\text{He} + \text{lattice energy (23.8 MeV)}$ ” [00102].

Also, in the presence of deuterium, as in disclosed embodiments, it is possible to have a limited number of neutrons produced through generation of high voltage by high frequency-pulse transformation or by electrostatic induction and high voltage break

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down with acceleration of some deuterons above threshold energy for neutron generation.

But, a few neutron generation is not enough for net energy production. For net energy production by d- d reaction it is necessary to generate at least $\sim 10^{12}$ neutrons per second for every Watt of generated (or spend) power. Activation of hydrides with hydrogen isotopes by ion beams and by discharge is a standard method of a nuclear fusion providing for neutron generation in a high quantity, but the fusion energy produced in this process is far below of energy used for said activation. There are no credible evidences that in Applicant's disclosed "method of heat generation" the net heat generation is possible.

The specification does not disclose a credible source of produced energy.

Below is presented a conclusions of DOE 2004 Report of the Review of Low Energy

Nuclear Reactions:

Reviewers expert in nuclear physics noted that the cold fusion mechanism put forward by proponents is not in accord with presently accepted knowledge of D + D fusion. Specifically, D + D fusion is accompanied by the production of protons, neutrons, tritons, ^3He , ^4He and high energy gamma rays, all in well known proportions. The fusion channel resulting in ^4He and high energy gamma rays occurs approximately only once for every 10^7 (D + D) fusion reactions. These characteristic proportions for the production of the fusion products are found for every energy of the incident deuteron measured so far, down to the lowest that has been measured. The review document and oral presentations made the argument that the branching ratios are different at low energies and that in cold fusion, ^4He fusion channel is predominant. According to the review document, no high energy gamma rays appear to accompany the ^4He , as is observed in D-D fusion reactions. Instead, the approximately 24 MeV in energy resulting from D-D fusion was purported to appear as heat in the material lattice. To explain these unusual characteristics, the reviewers were presented with a theoretical framework that purported to describe how collective energy from the material lattice couples to a deuteron pair to induce fusion, how the only fusion reaction channel that occurs would be the production of ^4He , and how all the energy is coupled back into the material in the form of heat instead of high energy gamma-rays. The reviewers raised

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serious concerns regarding the assumptions postulated in the proposed theoretical model for the explanation for ^4He production. The preponderance of the reviewers' evaluations indicated that Charge Element 2, the occurrence of low energy nuclear reactions, is not conclusively demonstrated by the evidence presented. One reviewer believed that the occurrence was demonstrated, and several reviewers did not address the question (page 4, lines 19+).

While significant progress has been made in the sophistication of calorimeters since the review of this subject in 1989, the conclusions reached by the reviewers today are similar to those found in the 1989 review (Page 5, lines 15+).

It is no any credible evidence for possibility of net energy generation by low energy activated fusion reaction with any catalyst.

As stated in MPEP § 2164.03, the amount of guidance or direction needed to enable the invention is inversely related to the amount of knowledge in the state of the art as well as the predictability in the art. The art of the present invention (method of heat generation in hydrogen condensate by nuclear fusion reaction is $2\text{D} + 2\text{D} = 4\text{He} +$ lattice energy (23.8 MeV) is so new that it cannot be considered to have a body of knowledge associated with it, much less predictability of results). Applicant has only provided data that is based upon questionable science, and so that data is also questionable until such time that applicant rigorously proves that the applied concepts were plausible and the data statistically sound. Since Applicant has not established the operability of the presently claimed invention as discussed, it is considered that the invention is lacking in utility. Given the state of the art as discussed herein, it would be unreasonable to expect one skilled in the art to be able to make and use the claimed invention without undue experimentation

It is well established that where, as here, the utility of the claimed invention is based upon allegations that border on the incredible or allegations that would not be readily

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accepted by a substantial portion of the scientific community, sufficient substantiating evidence of operability must be submitted by applicant.

Simply stating that the concepts the inventor espouses are correct is not sufficient substantiating evidence. Sufficient substantiating evidence may be based on widely accepted scientific concepts (e.g., quantum nuclear physics, credible experiment), a working model, or a supporting opinion in a widely respected and peer-reviewed publication (existing credible publications do not support optimistic Applicant's assumptions).

It is thus considered that the examiner has set forth a reasonable and sufficient basis for challenging the adequacy of the disclosure. The statute requires the applicant itself to inform, not to direct others to find out for themselves. MPEP 2107.01. Note that the disclosure must enable a person skilled in the art to practice the invention without having to design structure not shown to be readily available in the art; *In re Hirsch*, 131 U.S.P.Q. 198.

Given the state of the art as discussed herein, it is unreasonable to expect one skilled in the art to be able to make and use the claimed invention without undue experimentation.

The claimed invention as a whole must be **useful** and accomplish a **practical** application. That is, it must produce a "useful, concrete and tangible result". MPEP 2106, Section II. The purpose of this requirement to limit patent protection to inventions that possess a certain level of "real world" value, as **opposed to subject matter that**

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represents nothing more than an idea or concept, or is simply a starting point for future investigation or research. MPEP 2106, Section II.

MPEP 2164.01(a) Undue Experimentation Factors

There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue." These factors include, but are not limited to:

(A) The breadth of the claims- *is broad and doubtful, because the invention alleges to solve a "fusion energy generation and helium production" by process contradicted to modern science.*

(B) The nature of the invention- *there is a method of heat generation through nuclear fusion with low threshold activation energy "; the nature of the invention as disclosed thus involves very drastic change of hypotheses in the nuclear physics;*

(C) The state of the prior art- *effects claimed by applicant's were not observed in many experiments with much, much higher scale of energy activation. There are no evidences, that a claimed process can be used for net fusion energy production (Hydrogen isotopes localization produced in hydrides is hundred thousand times larger than hydrogen isotope size and cannot enhance significantly a nuclear transmutation probability);*

(D) The level of one of ordinary skill- *there is no experience for strong enough nuclear fusion enhancement by nanohydrides (hydrogen condensate) with hydrogen isotopes;*

(E) The level of predictability in the art- *a possibility for nuclear fusion with low activation energy, and net energy generation by said fusion with a hydrogen isotopes as claimed are likely impossible.*

(F) The amount of direction provided by the inventor- *is wholly insufficient because, inventor presented assumptions, speculations related to nuclear fusion and heat and helium generation are not conformed in independent experiments.*

(G) The existence of working examples- **example exist** but realization of heat and helium detection during activation of "hydrogen condensate"

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contacting with hydrogen isotopes (D2) is not credible and does not have independent confirmations.

(H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure- need undue experimentation and can have likely negative results.

Claim Rejections - 35 USC § 112

7. Claims 1, 6 and 9-11 are rejected under 35 U.S.C. § 112, first paragraph, as based on a disclosure which is not enabling. Concepts and methods critical or essential to the practice of the invention, but not included in the claims are not enabled by the disclosure as set forth in section 6 of this Office action. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

8. The following is a quotation of the second paragraph of 35 U.S.C. §112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1, 6 and 9-11 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is clear that a certain amount of energy is at least required for practicing the method, yet the claims are inclusive of the application of any conceivable level of energy. The claims therefore fail to particularly point and specifically claim the subject matter of the invention. The reason for this is set forth in section 6 of this Office Action.

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10. Claims 1, 6 and 9-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Said claims are indefinite because they can have different multiple interpretations. Particularly, Claim 1 recites "nano-ultrafine particle" (lines 3, 10, 13, 14). There is no quantitative definition of term " nano-ultrafine " in " nano-ultrafine particle " in the Specification. The wording " nano-ultrafine particle " is indefinite because the terms " nano-ultrafine " in claim 1 is an undetermined term which renders the claim indefinite. The terms " nano-ultrafine " is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 101

11. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claims 1, 6 and 9-11 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility, as set forth in section 6 of this Office Action.

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13. Claims 1, 6 and 9-11 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a credible asserted utility or a well established utility for the reasons set forth above in section 6[, one skilled in the art clearly would not know how to use the claimed invention.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claim **6** is rejected under 35 U.S.C. 102(b) as being anticipated by Lingelbach et al. (US Patent No. 5,770,747, Lingelbach hereinafter).

Regarding claim **6**, Lingelbach discloses: A hydrogen condensate, comprising: a metal nano-ultrafine particle containing a plurality of $\text{ZrO}_2\text{.Pd}$ particles (a palladium catalyst on a support of zirconium dioxide (column 1, lines 20+)) ; and a plurality of deuterium atoms solid-dissolved among the plurality of $\text{ZrO}_2\text{.Pd}$ particles, wherein at least two of the plurality of deuterium atoms are condensed so that an inter-atomic nuclear distance between the two deuterium atoms is smaller than or equal to an internuclear spacing of a molecule consisting of the two deuterium atoms; and wherein

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the hydrogen condensate is produced by: providing the nano-ultrafine particle in a container; evacuating the container to high level of vacuum; introducing the deuterium atoms into the container so as to solid-dissolve the deuterium atoms in the nano-ultrafine particle so that the hydrogen condensate has a hydrogen isotope atoms/nano-ultrafine particle atom ratio of 250% or more (the reduction and activation of the catalysts with hydrogen can take place in situ in the hydrogenating reactor during hydrogenation (column 2, lines 24+).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

17. Claims 1 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hagelstein (US 2007/0286324 A1) in view of Lingelbach et al. (US Patent No. 5,770,747, Lingelbach hereinafter).

The method as claimed is unpatentable over prior arts, but the utility as asserted in the specification of applicant is not enabled in the reference either.

Regarding claims 1 and 9-11 Hagelstein discloses: a method of generating heat (the d+d reaction leading to 4 He, [0074]) using a hydrogen condensate (compact state of hydrogen isotopes introduced in palladium lattice [0073].

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(ii) applying energy to the hydrogen condensate sufficient that at least two of the plurality of deuterium atoms solid-dissolved in the hydrogen condensate fuse; and

(iii) generating heat by causing the at least two deuterium atoms to fuse with each other due to the energy ("A method and apparatus employ stimulating a material to cause reactions in the material, wherein the material comprises deuterium, and wherein the reactions generate vibrational motion of the material, coupling the vibrational motion to a transducer that generates energy from the vibrational motion of the material, and directing the energy to an electrical device" (Abstract)).

Hagelstein does not necessary teach limitations: the hydrogen condensate comprises a metal nano-ultrafine particle containing a plurality of $\text{ZrO}_2\text{.Pd}$ particles and a plurality of deuterium atoms solid-dissolved among the plurality of $\text{ZrO}_2\text{.Pd}$ particles, such that at least two of the plurality of deuterium atoms are condensed so that an inter-atomic nuclear distance between the two deuterium atoms is smaller than or equal to an internuclear spacing of the deuterium atoms in a deuterium molecule.

(i)condensing the hydrogen condensate by

(a) providing the nano-ultrafine particle in a container;

(b) evacuating the container to high level of vacuum:

(c) introducing the deuterium atoms into the container so as to solid-dissolve the deuterium atoms in the nano-ultrafine particle so that the hydrogen condensate has a deuterium atoms/nano-ultrafine particle atom ratio of 250% or more;

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Lingelbach, drawn to a

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catalytic hydrogenation with a palladium catalyst, hence a similar step process of hydrogen isotopes accumulation in palladium particles. Lingelbach teaches a palladium catalyst on a support of zirconium dioxide (column 1, lines 20+).

Motivation for said inclusion derives from Hagelstein: To maximize the molecular deuterium concentration in the metal ([0089]).

Conclusion

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

19. Any inquiry concerning this communication or earlier

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communications from the examiner should be directed to Vadim Dudnikov whose telephone number is 571- 270-1325. The examiner can normally be reached on 8:00 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached, Mon-Fri 7:00am-4:00 pm, at telephone number 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

20. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VD. 8/21/08

/Johannes P Mondt/

Primary Examiner, Art Unit 3663